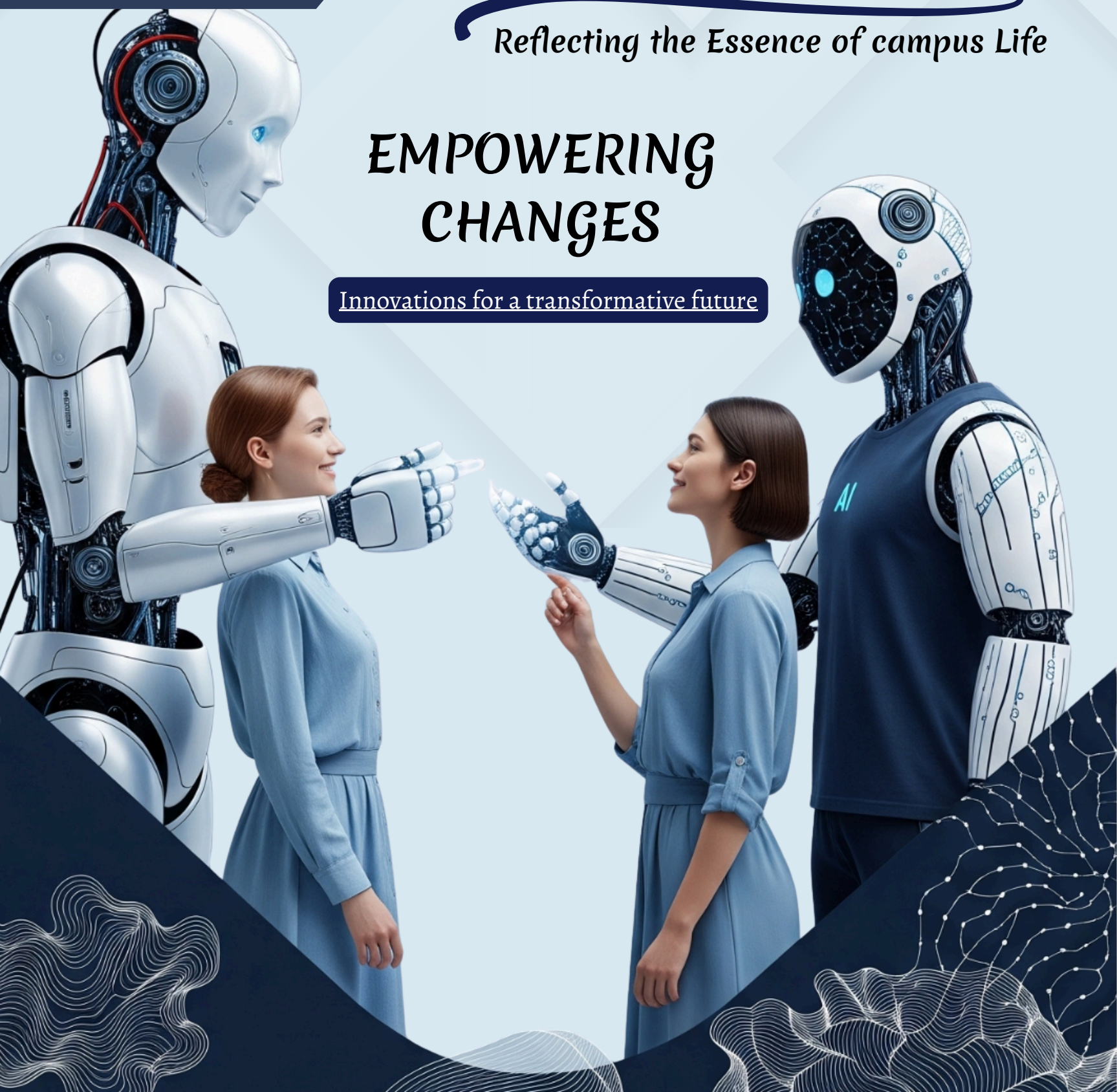


COE CHRONICLE

Reflecting the Essence of campus Life

EMPOWERING CHANGES

Innovations for a transformative future



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Dr. Sushil Kamboj
Executive Editor

It gives me immense pleasure to present this edition of our magazine, themed "Empowering Change: Innovations for a Transformative Future."

In a world marked by rapid technological evolution and shifting societal paradigms, innovation is not merely a choice it is a necessity. Through this edition, we represent the ideas, efforts, and breakthroughs that are reshaping our communities, industries, and future.

Each article and feature reflects the spirit of progress and the power of collective vision. From sustainable technologies and digital revolutions to social entrepreneurship and educational reforms, this compilation showcases how innovation can be a catalyst for inclusive and meaningful transformation I hope this magazine inspires readers to not only imagine a better future but to actively contribute to building it with creativity, compassion, and courage. "Let innovation lead the way to a brighter tomorrow!"

Happy reading!



Dr. Anuj Kumar Gupta
Chief Editor

Dear Readers,

Proud to present Chronicle Magazine on **"Empowering Change,"** highlighting our community's role as changemakers in today's evolving world.

We are living in times of rapid shifts—technological, environmental, and social. These challenges call for more than observation; **they demand innovation and action.**

This magazine celebrates that spirit. It brings together **thought-provoking articles, research breakthroughs, entrepreneurial efforts, creative expressions, and student-led initiatives.**

Innovation isn't only about inventions. It's about new perspectives, bold questions, and meaningful action. Our community continues to show the courage and creativity needed to lead change—**and this magazine showcases that beautifully.**

As the editorial team, we're honored to present a platform that highlights not just academic success, but also growth, leadership, and resilience. We hope each page sparks curiosity and strengthens your belief in change powered by education and empathy.

Let this edition inspire you to ask—**how can your ideas shape a better future?**

With warm regards,
The Editorial Team

4TH INTERNATIONAL CONFERENCE INNOVATION IN COMPUTING

2025 (ICIC2025) 24th – 25th April 2025 {Hybrid Mode}



The 4th International Conference on Innovation in Computing (ICIC-2025.) was successfully organized by CGC College of Engineering, Landran, during April 24–25, 2025. The conference provided as an international forum that brought together leading academicians, researchers, and research scholars from across the globe to exchange and share their experiences on technological advancements in the field of computing. ICIC-2025 provided a vibrant interdisciplinary platform for researchers, practitioners, and educators to present and discuss recent innovations, emerging trends, and pressing challenges in computer technologies and their industrial applications. Areas of application included health care, smart transportation, agriculture, artificial intelligence, and more.





The Organizing Committee welcomed submissions of original research articles from global researchers, engineers, and scientists. The conference facilitated meaningful interaction and knowledge-sharing among participants and aimed to foster global collaboration in computer science and allied domains.



The key objectives of the conference were:

- To familiarize attendees with the latest trends in computational technologies.
- To spread awareness about emerging research topics, challenges, and potential solutions.
- To promote lifelong learning through various technical sessions, algorithms, case studies, and novel approaches.
- To nurture a research and innovation culture among academia and industry stakeholders.
- To provide deeper insights into modern technologies through diverse presentations and engaging discussions.
- To offer participants a glimpse of upcoming trends and innovations in the near future.
- To create opportunities for researchers to share their ideas and real-world application experiences face to face.



TRACKS FOR PAPER SUBMISSION

Track 1 -
Internet of Things

Track 2 -
Cloud computing Approaches in
Health Care

Track 3 -
Machine Learning

Track 4 -
Communication Networks Track



Track 5 -
System Design & Methodologies

Track 6 -
Big Data Analytics & Applications

Track 7 -
ICT for Sustainable Environment

Track 8 -
Multidisciplinary : Innovative
Solutions for the Environment &
Energy.



KEYNOTE SPEAKERS OF ICIC 2K25

**Dr. Valentina Emilia Balas**

Aurel Vlaicu University of Arad Romania
(Professor)

It is an honor to be part of this prestigious event—the International Conference on Innovations in Computing (ICIC 2025), held on 24th–25th April 2025 at CGC College of Engineering, Landran. This platform brings together academicians, researchers, and industry leaders to exchange knowledge, share cutting-edge research, and foster collaboration across diverse domains of computer science.

I commend the organizers for their dedication in creating such an interdisciplinary forum, enabling discussions on the latest advancements and future trends in technology. Their vision in spearheading this initiative is truly commendable.

My heartfelt congratulations to the entire team for their efforts, and my best wishes to all participants for an engaging and fruitful conference. May ICIC 2025 inspire innovation, forge new partnerships, and contribute significantly to the ever-evolving field of computing.

Wishing the event grand success!

**Dr. Gagangeet Singh Aujla**

Durham University, United Kingdom
(Associate Professor)

It is both an honor and a privilege to extend my heartfelt greetings to everyone associated with the International Conference on Innovations in Computing (ICIC 2025), hosted at CGC College of Engineering, Landran, on 24th–25th April 2025. I deeply appreciate the significance of such platforms that bridge academia, industry, and research. ICIC 2025 focus on cutting-edge advancements in Computer Science spanning AI, IoT, cybersecurity, quantum computing aligns perfectly with the global need for collaborative innovation.

I commend the organizers for their vision in creating this interdisciplinary forum, which promises to ignite meaningful discussions, foster partnerships, and accelerate technological progress. To the participants: Your research and insights are the driving force behind such conferences, and I encourage you to engage actively, share boldly, and explore the synergies this event offers.

Wishing ICIC 2025 resounding success, and may this conference inspire breakthroughs that shape the future of computing



KEYNOTE SPEAKER OF ICIC 2K25



Dr. Rupert Ward

Professor of Learning Innovation
(Associate Dean - International),
Department of Computer Science at University of Huddersfield, United Kingdom

"We are the original programmers life itself is our most complex software."

–Lena Kowalski

It is with great enthusiasm that I express my privilege in being part of the International Conference on Innovations in Computing (ICIC 2025), hosted at CGC College of Engineering, Landran, on 24th–25th April 2025. This prestigious event stands as a testament to the power of collaboration, uniting academicians, researchers, and industrialists to exchange groundbreaking ideas and shape the future of Computer Science.

I extend my sincere congratulations to the organizers for their visionary efforts in creating this platform. Their commitment to fostering innovation and cross-sector dialogue is commendable. To the participants: Your research and engagement are the lifeblood of such events, and I encourage you to seize this opportunity to collaborate, challenge conventions, and ignite transformative ideas.

Wishing ICIC 2025 resounding success, and may this conference inspire actionable insights that propel our discipline forward.



IGNITING TOMORROW: BREAKTHROUGH INNOVATIONS FOR SUSTAINABLE PROGRESS



Ms. Sohni Bagga
Assistant Professor
Applied Sciences COE

The 21st century is at the verge of an extraordinary bend where technology and society have experienced consciousness, and the need of environment, come together to build brand-new chances of transformative change. We live in times with intricate issues, from climate change to social degradation and it is up to us to ride through the waters. Inequality, new solutions are coming up that will not only lead to increment gains, but also radical changes in the manner of living, working, and relating with the world.

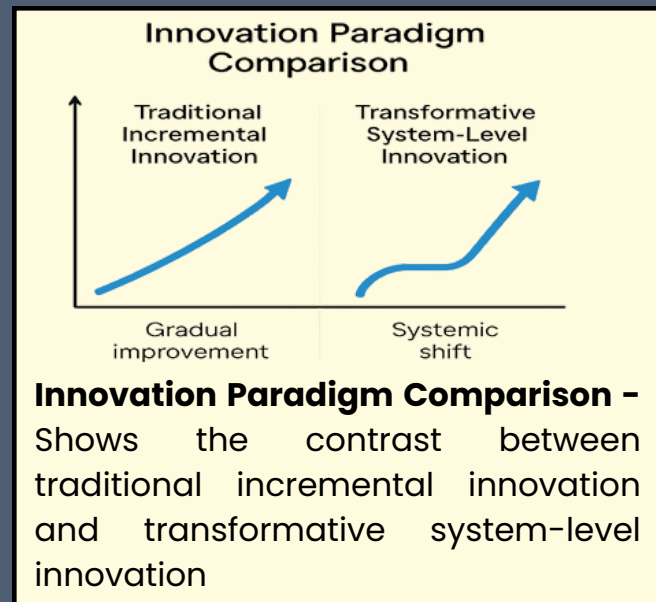
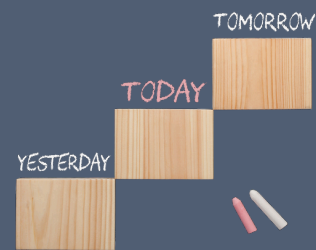
The New Paradigm of Innovation

The classic innovation was usually aimed at efficiency and maximizing returns with the preexisting systems. The current innovative revolutions however pose a challenge to the existence of those systems. They are a response to the realization that much of our present ways of doing things are unsustainable and that there is no substitute to the need to change it. To move forward, the re-imagining of whole structures is necessary as opposed to the optimization of preexisting ones.

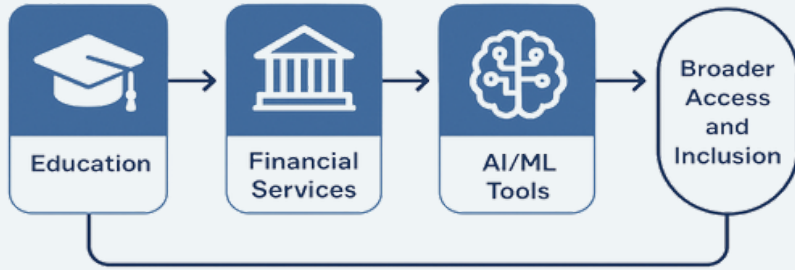
This change is an example of proactive redesign as opposed to response-based based-approach to solving problems. Instead of the question how can we do it better? they are increasingly not only questioning, but also asking themselves the question: should we be doing this at all, and assuming that we can, how can we make it entirely different? This paradigm shift has paved the way for solutions that were unimaginable only a few decades ago.

Technology as a Force for Democratization

Machine learning and artificial intelligence no longer are limited to research organizations and tech titans. Such things have been enabled by open-source framework and cloud computing and strong new technologies which are available to everyone and small organizations all over the world.



Technology Democratization Flow



Technology Democratization Flow - Illustrates how technology democratization flows through education, financial services, and AI/ML tools to create broader access and inclusion

Challenges and Opportunities Ahead

Digital divides continue to lock out a number of people societies of the advantages of technology. Environmental innovations should expand at accelerated rates to resolve climate urgency. The social innovations usually face resistance of the vested interests, institutional shackles. But at the same time these difficulties are opportunities of new innovations. The race to reduce climate urgency is increasing the implementation of sustainable solutions. The drive towards generating alternative sources is caused by institutional resistance. organizational models. The COVID-19 pandemic revealed the vulnerability of the established systems on the one hand and the rapidity on the other hand where innovation can be done when need requires. Remote working technology, vaccines support a new level of growth, innovation and paths to improvement in the areas like development, and public health monitoring systems have progressed years ahead within months.

Building the Transformative Future

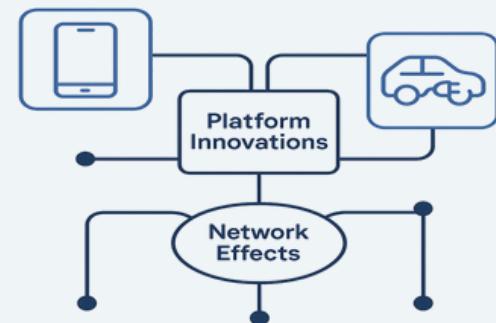
Building a transformative future requires more than isolated innovations—it needs a holistic, human-centered approach. True innovation goes beyond speed and cost; it fulfills human needs, making life more meaningful, fair, and sustainable.

Sustainable Solutions Reshaping Industries:

Sustainable innovation is transforming industries by driving cleaner technologies and new economic models. In energy, solar and wind are now among the cheapest electricity sources, enabling community solar projects and peer-to-peer energy trading that decentralize and localize power distribution. Simultaneously, the circular economy is reshaping production, replacing linear models with reuse, repair, and regeneration. From fashion rentals to modular manufacturing, industries are turning waste into opportunity, redefining value while promoting environmental and economic sustainability.

The Power of Interconnected Systems

Interconnected Systems Network



The power of innovation lies in interconnected systems. Smartphones sparked a revolution not just by being smart, but by serving as platforms for countless innovations—like ridesharing, social media, and mobile payments—that transformed daily life through their network effects.

FROM RESEARCH TO REALITY: INNOVATIONS TRANSFORMING OUR WORLD



Gagandeep Kaur
Computer Science

Behind every life-changing innovation lies years of research, endless trials, and the unwavering curiosity of brilliant minds working silently in laboratories. From vaccines that save millions to technologies that empower our daily lives, scientific breakthroughs have long been the driving force of human progress. Today, more than ever, we are witnessing the incredible journey of ideas moving from lab to life transforming not just industries, but the very way we live, connect, and evolve across fields medicine, environment, energy, artificial intelligence, and materials science groundbreaking discoveries are stepping out of research journals and entering the real world with remarkable impact.

Life-saving mRNA vaccines, once a concept in molecular biology labs, are now frontline tools in global health defense. Similarly, innovations in clean energy, like perovskite solar cells or hydrogen fuel technologies, are shaping the path toward a more sustainable planet. The digital revolution is another testament to this transition. Algorithms once confined to academic computer labs now power everyday conveniences voice assistants, recommendation engines, language translation, and autonomous systems.



These once-theoretical models are now embedded in our phones, homes, and vehicles, making life more efficient, connected, and intelligent. What's truly inspiring is how these breakthroughs are becoming more accessible and inclusive. Portable medical devices developed through biomedical research are reaching rural clinics. Affordable water purification systems engineered in university labs are being deployed in water-scarce regions. Assistive technologies born in innovation canners are empowering individuals with disabilities to lead independent lives. Science, once distant from the public sphere, is becoming people-centric and purpose-driven.

Yet, the journey from lab to life is not without its challenges. Scaling, affordability, regulation, and public acceptance remain key hurdles. This is where collaboration plays a vital role—between researchers, entrepreneurs, industries, and policymakers. Only when innovation meets infrastructure and intention can true transformation happen.

As we celebrate scientific advancement, we must continue to support the spirit of inquiry and invest in research. Every breakthrough starts with a question. And in the hands of the right minds, that question can change the world.

"Today's lab experiment is tomorrow's solution shaping a better, brighter world for all!"

ENGLISH LANGUAGE TEACHING DEVICE FOR NON NATIVE SPEAKERS



Patent Status: Granted
Application Number: 202511019961
Date of Filing: 28/03/2025



Gurpreet kaur

In a remarkable stride toward inclusive education, a team of distinguished innovators has introduced a patented **English Language Teaching Device for Non-Native Speakers**. Spearheaded by **Dr. Gagandeep Bhullar and Ms. Gurpreet Kaur**, along with co-applicants **Dr. Ajay Kumar Yadav, Dr. Arun Kumar Yadav, Dr. Ashutosh Kumar, Mrs. Najmusher H, Dr. K. Shaheen, Dr. P. Basheer Khan, and Dr. V. Kannan**, this novel invention is a game-changer for English language instruction.

What sets this device apart is its unique shape and configuration, carefully designed to aid learners from diverse linguistic backgrounds. While the patent does not lay claim to the internal mechanisms or technical operations of the device, it emphasizes the distinctive physical design, which plays a pivotal role in enhancing usability and learner engagement.

This innovative teaching aid aims to simplify English language acquisition by catering specifically to the needs of non-native speakers, making it an ideal tool for schools, training centers, and self-learners alike. Registered officially on March 28, 2025, the invention marks a forward leap in educational technology.

In a world that increasingly values global communication, such innovations bring us closer to a more linguistically inclusive future.



NUTRILENS: SMART KIOSK FOR DECODING FOOD LABELS



Patent Status: Filed

Application Number: 202511019961

Date of Filing: 29/01/2025



Dr. Pardeep Singh Tiwana

The **“Nutrilens: Smart Kiosk for Decoding Food Labels”** developed by **Pardeep Singh Tiwana, Gagandeep Kaur, Jagbir Singh, Harshil Jain and Harshit Singla** under Reference No. CBS 230, Nutrilens is an innovative AI-powered kiosk system designed to simplify and personalize nutritional awareness at the point of purchase. It addresses a pressing concern in modern consumer behavior difficulty in understanding complex food labels and nutritional data. The kiosk uses Optical Character Recognition (OCR), Artificial Intelligence (AI), and Natural Language Processing (NLP) to decode intricate information and convert it into user-friendly insights. This technology helps consumers make informed decisions about their food choices, preventing unhealthy eating habits and reducing the risk associated with allergens or harmful additives.

The system's standout features include real-time, on-site nutritional analysis via interactive touchscreen kiosks installed in retail stores. Unlike mobile apps that require user effort to scan, Nutrilens provides immediate feedback without needing a smartphone. It generates customized, visually accessible health reports, enabling users of varying literacy levels and tech skills to understand the benefits or risks associated with each product. It also offers multilingual and audio output options for enhanced accessibility.

By tailoring dietary recommendations to individual health profiles, Nutrilens demonstrates a transformative application of AI and NLP in the healthcare and wellness domains. The invention presents clear novelty and inventive steps beyond existing prior arts, as confirmed by the patentability report.



INTEGRATED HEALTH MANAGEMENT AND EMERGENCY RESPONSE SYSTEM WITH REAL TIME MONITORING



Patent Status: Filed

Application Number:202511005394

Date of Filing:22/01/2025



Mr. Dishant Khosla

The **“Integrated Health Management And Emergency Response System With Real Time Monitoring”**, developed by **Mr. Dishant Khosla, Mr. Pankaj Palta, Ms. Vandna, Dr. Harvinder Singh, Ms. Parul, & Mr. Sambhav**, is an advanced, all-in-one healthcare management application designed to revolutionize emergency response and personal health monitoring through the integration of AI, AR, IoT, and real-time data systems. Born from a real-life tragedy caused by delayed ambulance access, this patent addresses critical gaps in medical accessibility by offering features such as instant ambulance booking with dynamic re-routing, real-time hospital equipment availability, biometric health tracking via wearable integration, and a secure digital health record system accessible through QR codes.

The app supports voice commands, multilingual access, and SOS alerts, making it user-friendly for elderly individuals and diverse populations. Leveraging Augmented Reality (AR), it provides first-aid guidance, ambulance arrival preparation, and hospital navigation. Patent also includes AI-powered health insights, doctor ratings, hospital comparisons, and a unique blood group-based emergency network.

This invention sets a new benchmark in digital health solutions, enabling rapid, informed, and personalized medical assistance anytime, anywhere—ultimately saving lives and empowering users to take control of their healthcare journey.



INTERACTIVE 3D HOLOGRAM



Patent Status: Filed

Application Number: 202511019961

Date of Filing: 05/03/2025



Gagandeepkaur

The invention titled **“Interactive 3D Hologram”**, developed by **Gagandeep Kaur, Dr. Pardeep Singh Tiwana, Dr. Sushil Kamboj, Jagbir Singh, Aman Kumar, Aryan Dadwal** under reference number CBS 247, introduces a futuristic system for eye condition monitoring through a gesture-based holographic interface. The system, known as HoloTouch, integrates advanced hardware and AI-powered software to offer an immersive and interactive 3D visualization experience. It employs eyewear equipped with laser, voice, image, and ultrasonic sensors that interact with a holographic display projected above a specialized table structure.



The core system features pipelined CPUs and GPUs within a table-based platform, cooled using a liquid nitrogen system to ensure optimal performance. Corner-mounted lasers create a 3D holographic space above the table, enabling real-time projection. Users interact through specialized gloves designed for accurate gesture detection, while transparent eyewear mounted on the right ear tracks pupil movement, allowing intuitive control and real-world object scanning to support 3D model creation.

This system is supported by advanced software tools such as AI STELLA and Bell, which enhance the user interface and health analytics. Ultrasonic sensors add another layer of interactivity, making the system suitable for real-time medical diagnostics and immersive learning environments.

ADAPTIVE BEAM CONTROL SYSTEM (ABCS)



Dr. Ajaybeer Kaur

LORA RAILWAY SAFETY SYSTEM FOR ACCIDENT PREVENTION



Ms. Neha Sharma



Patent Status: Filed

Application Number: 202511004952

Date of Filing: 21/01/2025



Patent Status: Filed

Application Number:

202511021680

Date of Filing: 11/03/2025

The "Adaptive Beam Control System (ABCS)," developed by Dr. Ajaybeer Kaur, Ms. Navneet Kaur, Vasu Gupta, Yuvraj Punia, Anish Dhiman, Aarzu, and Dr. Santosh Kumar, is an advanced automotive lighting solution designed to enhance road safety and driver comfort. It uses AI and sensors to detect vehicles, pedestrians, and cyclists, adjusting headlight beams in real time to prevent glare and ensure clear visibility. ABCS integrates GPS and mapping data to adapt to curves, hills, and intersections, and maintains consistent performance in fog, rain, or snow. Biometric sensors track driver fatigue through eye and facial movement, adjusting brightness or using subtle pulsations to maintain alertness. It distinguishes between natural and artificial light, optimizing beam settings for urban and rural environments. ABCS also communicates with smart infrastructure to boost energy efficiency and reduce nighttime accidents.

The "LORA Railway Safety System for Accident Prevention," developed by Ms. Neha Sharma, Mr. Kabir, and Ms. Mankiran Kaur, is a smart safety solution designed to prevent train collisions by detecting obstacles, especially living beings, on railway tracks. It uses pyroelectric sensors placed along the tracks to detect motion. When movement is sensed, signals are sent via LORA (Long Range Radio) technology to a central server for real-time analysis. If an obstacle is confirmed, alarms on trackside poles emit a beep, and a voice alert is generated in the latch room, specifying the distance between the approaching train and the obstacle. This allows for quick, informed responses by operators and control personnel. If no motion is detected, the system stays in standby mode. Scalable and intelligent, the system aims to reduce human error and enhance railway safety by enabling timely alerts.

ANTI-THEFT BIOMETRIC SIM LOCK & SYSTEM

**Patent Status: Filed****Application Number:202411094521****Date of Filing:29/11/2024****Mankiran Kaur**

The “**Anti-Theft Biometric Sim Lock & System**” thereof developed by **Ms. Mankiran Kaur, Mr.Kashish, Mr.Harshita, Ms.Amitabh,** and **Mr.Abhishek**. It is an innovative idea to secure phone. Biometric SIM Ejection System (BSES) is a cutting-edge security solution designed to prevent unauthorized removal of SIM cards from mobile devices. It integrates biometric authentication with a motorized SIM ejection mechanism, ensuring that only authorized users can access the SIM card tray. The system is composed of four key components: a biometric sensor (fingerprint or facial recognition), a modified SIM tray with a small motor, a dedicated microcontroller, and integration with the device’s operating system.

When a user attempts to eject the SIM card, the biometric sensor activates and prompts for authentication. If the biometric sample matches the stored template, the microcontroller signals the motorized mechanism to eject the SIM tray. If authentication fails, the system initiates a multi-layered security response: the device is automatically locked, GPS coordinates are sent to a predefined server or law enforcement agency, and images from both front and rear cameras are captured to identify the person attempting access.

BSES enhances security by combining physical and digital protection. It is particularly valuable in scenarios involving lost or stolen devices, offering real-time tracking and evidence capture. The system also integrates with the operating system to ensure seamless communication and execution of security protocols.

In summary, BSES provides a secure and intelligent solution to protect sensitive information and prevent unauthorized SIM card access. By leveraging biometric verification, remote alerts, and visual monitoring, it adds a strong defense layer to modern mobile devices.



FACULTY DEVELOPMENT PROGRAMME ON UNIVERSAL HUMAN VALUES



The CGC College of Engineering, Landran, in collaboration with the Department of Student Welfare, successfully organized a three-day Faculty Development Program (FDP) titled "Introductory FDP on Universal Human Values (UHV) by AICTE" from June 26th to 28th, 2025. Held in the Seminar Hall, the event brought together approximately 85 faculty members for an intensive offline learning experience focused on holistic human development. The primary aim of the FDP was to empower educators with the tools and perspectives needed to guide students toward living a balanced, purposeful, and value-based life. Through various engaging sessions, the program emphasized the significance of developing right understanding in individual an awareness of the self, relationships, and the broader existence.





Participants explored key concepts such as human goals, societal harmony, and sustainable living. The FDP highlighted the importance of two foundational components of a harmonious society: Education, which cultivates awareness of harmony at every level from self to society and nature, and Sanskar, the practice of living with values, responsibility, and mutual respect. Faculty were encouraged to nurture in students not just academic excellence but also emotional intelligence, ethical values, and practical skills for sustainable prosperity.

By the end of the program, participants gained clarity on the essence of human consciousness and conduct, and the role of education in shaping responsible and self-reliant individuals. The sessions served as a transformative experience, reminding educators of their crucial role in nation-building through value-based education. The FDP marked a significant step toward fostering a community of enlightened, compassionate, and capable educators ready to shape the future generation.





Authors: SWARN SINGH, SANTOSH KUMAR, VIRAT KHANNA

Abstract

In modern industry different techniques are used to protect the material from degradation exposed to chemical or mechanical damage. Most of the manufacturing and service industries suffer with high financial loss due to wear and degradation of the metal components worldwide. To overcome from these losses different surface modification techniques are employed. These techniques include physical and chemical vapor deposition, sol-gel, micro-arc oxidation, electrodeposition processes and thermal spraying, etc. However, each process has their own merits and drawbacks limiting their applications. Hence, this paper provides an overview on distinct surface modification techniques used by various researchers. So, that futuristic researcher can adopt suitable combination of substrate, coating and process for a particular application. Thus, by developing additional advanced coating methods and materials it is promising to improve the qualities of protection in the future.

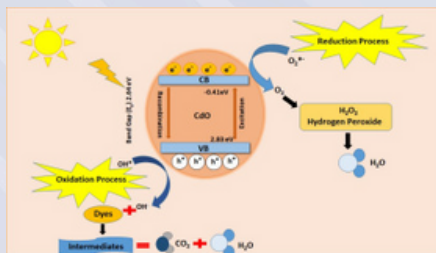
HIGH-TEMPERATURE OXIDATION PERFORMANCE OF HVOF AND PLASMA-SPRAYED Ni-20Cr, Ni-20Cr + TiC, AND Ni-20Cr + TiN COATINGS ON T22 BOILER STEELS

Authors: KULDEEP KUMAR, SANTOSH KUMAR, HARJOT SINGH GILL

Abstract

Thermal-sprayed coatings utilizing Ni-20Cr tend to be employed to safeguard boiler steels from corrosion, erosion, and oxidation at higher temperatures. However, carbide and nitride are well known for having unique characteristics under challenging conditions, owing to higher thermal stability, wear resistance, high melting point, and high hardness. In the current study, T22 steel was coated with Ni-20Cr, 60% (Ni-20Cr)+40% (TiC), and 60% (Ni-20Cr)+40% (TiN) utilizing plasma spray (PS) and high-velocity oxy fuel (HVOF) for prevention in an extreme boiler environment. The microstructure of the deposited coatings and their oxidation behavior at extreme temperatures were analyzed. It was observed that the deposited coatings were uniformly thick and that they were well-intact to the substrate. Furthermore, a weight change study was carried out for 50 cycles at 900°C in a controlled environment to determine the high-temperature oxidation behavior of the as-sprayed coatings. X-ray diffraction (XRD), scanning electron microscopy/energy dispersive spectroscopy (SEM/EDS), and X-ray mapping analysis were used to examine the bare, coated, and oxidized substrates. The air oxidation study observations indicate that the development of an unprotected phase (Fe₂O₃) caused severe spalling and surface cracking of oxide scale deposited on bare steel. HVOF-sprayed Ni-20Cr+TiC coating on T22 steel reduced the maximum weight gain by 99.85% compared to bare steel. Higher microhardness, less porosity, and the development of protective oxide scale (Cr₂O₃, TiO₂, NiTiO₄, and NiO) are responsible for the enhanced resistance of HVOF-sprayed Ni-20Cr+TiC-coated T22 steel against oxidation.

Unveiling the photocatalytic properties of cadmium oxide for sustainable approach towards water remediation: A review



Authors: SURESH KUMAR
VIKAS DHIMAN
RAMAN KUMAR
SARABJEET KAUR
PRIANKA SHARMA
KULVINDER SINGH

Abstract

The current state of water resources demonstrates the contamination caused by industrial wastewater draining's supremacy. Because of the serious health and environmental risks caused by the contaminated waterways, a workable solution is needed to address its effect. This review paper presents a comprehensive investigation of the photocatalytic applications of CdO based nanomaterials, including undoped CdO, doped CdO, and CdO coupled with other semiconductors. Through a systematic analysis, we elucidate the diverse characteristics of these nanomaterials, shedding light on their potential applications in various fields. Moreover, this review explores the promising prospects of utilizing CdO-based nanomaterials for environmental remediation, particularly in the photodegradation of textile dyes. Higher the carrier concentration, higher intrinsic mobility, greater transparency of CdO, its tunable band gap and large surface area are its distinguishable characteristics that make it a promising candidate for photocatalytic applications. By leveraging their unique properties, CdO-based nanomaterials offer a sustainable and efficient approach towards addressing environmental challenges associated with textile dye pollution.

Weakening of shell gap and shape coexistence in 40Mg, 42Si, and 44S

Authors: PANKAJ KUMARA, KHURSHEED AHMAD RATHER, G.H. BHATC

Abstract: The suppression of $N = 28$ shell closure is expected towards proton deficient nuclei. As a consequence of which, coexistence of different nuclear shapes occurs in the even-even isotones of $N = 28$. We have applied covariant density functional theory based on the relativistic energy density functional DD-PCX to study the ground state and shape coexistence in ^{40}Mg , ^{42}Si , ^{44}S , and ^{46}Ar (even-even $N = 28$ isotones). The binding energy maps, calculated from unconstrained and constrained calculations, indicate a deformed ground state minimum for ^{40}Mg , ^{42}Si , and ^{44}S . Different nuclear shapes are found to coexist in these nuclei within small excitation energies. In ^{40}Mg and ^{42}Si , rigid shapes with different deformations coexist with excitation energies around 2–3 MeV, while ^{44}S is expected not to have any particular shape due to a small value of excitation energy. The quenching of shell gap in these nuclei is related to the inversion of neutron orbits with different values of Ω and quadrupole excitations neutrons across π orbits. For further investigation of shape coexistence in these nuclei, we have employed the triaxial projected shell model in which the deformation parameters, calculated from covariant density functional theory, are taken in input. The presence of $0^+ 2$ state in the low-lying energy spectra of these nuclei support existence of shape coexistence in ^{40}Mg , ^{42}Si , and ^{44}S . Furthermore, a reduced value of electric monopole transition strength, in ^{44}S , is utilized as a probe for weak mixing of prolately and oblately deformed shapes.

GREEN STEPS TOWARD A SUSTAINABLE FUTURE : BEAT PLASTIC POLLUTION



In a heartfelt tribute to nature and in observance of World Environment Day, the NSS Unit of CGC College of Engineering, Landran organized a Tree Plantation Drive on 24th June 2025 within the college premises. The event was held with great enthusiasm under the vibrant theme #BeatPlasticPollution, highlighting the urgent need to embrace sustainability and environmental awareness. The drive began with a collective spirit as faculty members, NSS volunteers, and students gathered to plant saplings in the campus green belt.





Esteemed faculty members actively participated by planting trees alongside students symbolizing unity, awareness, and responsibility toward nature. The initiative was more than a ceremonial event; it was a hands-on demonstration of environmental stewardship.

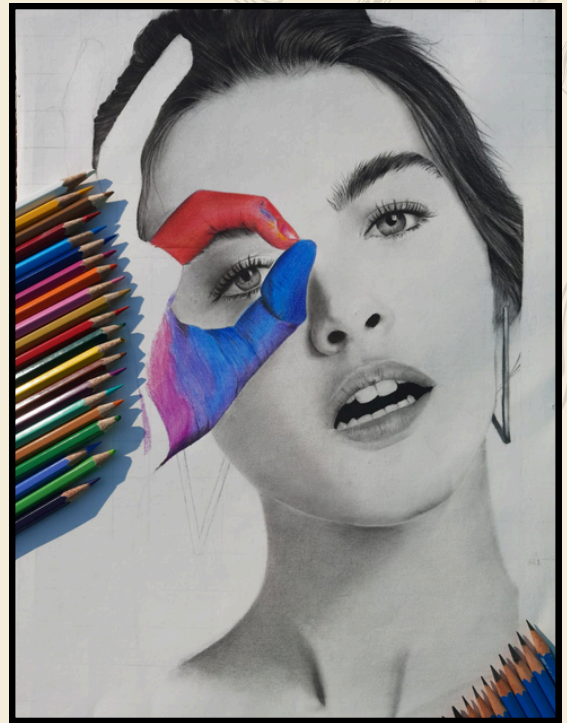
Participants expressed their commitment to preserving the planet by taking this small yet impactful step of planting trees, which serve as nature's guardians in combating pollution, reducing carbon footprints, and restoring ecological balance. Through their participation, students developed a stronger connection with the environment and were inspired to adopt eco-friendly practices in daily life.

The activity not only contributed to increasing the green cover of the campus but also instilled a sense of accountability and environmental consciousness among the attendees. The visible joy on the faces of students and staff as they planted and watered the saplings reflected the deep-rooted belief that every tree planted is a promise of a greener tomorrow.





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